

CLAIMS

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A. 1. A structure comprising:
a laminate substrate having a top surface for receiving a semiconductor die;
an antenna element situated on a bottom surface of said laminate substrate, said
5 antenna element being suitable for connection to said semiconductor die;
a laminate substrate reference pad in said laminate substrate, said laminate substrate
reference pad situated over said antenna element;
at least one laminate substrate reference via situated at a side of said antenna
element.

2. The structure of claim 1 wherein said laminate substrate reference pad is a
laminate substrate ground pad.

3. The structure of claim 1 wherein said at least one laminate substrate
15 reference via is a laminate substrate ground via.

4. The structure of claim 1 wherein said at least one laminate substrate
reference via is electrically connected to said laminate substrate reference pad.

20 5. The structure of claim 1 wherein said at least one laminate substrate
reference via is electrically connected to a printed circuit board reference via in a printed
circuit board.

6. The structure of claim 5 wherein said printed circuit board reference via is connected to a printed circuit board reference pad.

7. The structure of claim 1 wherein said laminate substrate comprises an organic material.

8. The structure of claim 1 wherein said laminate substrate comprises a ceramic material.

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9. The structure of claim 1 wherein a shape of said antenna element is selected from the group consisting of a square shape, a rectangular shape, a slot line pattern, a meander line pattern, and a patch pattern.

10. The structure of claim 1 wherein said at least one laminate substrate reference via is electrically connected to a laminate substrate ball pad on said bottom surface of said laminate substrate.

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11. A structure comprising:
a laminate substrate having a top surface for receiving a semiconductor die;
an antenna element situated on a bottom surface of said laminate substrate, said antenna element being suitable for connection to said semiconductor die;
a laminate substrate reference pad in said laminate substrate, said laminate substrate reference pad situated over said antenna element;

a plurality of laminate substrate reference vias, each of said plurality of laminate substrate reference vias situated at a side of said antenna element.

12. The structure of claim 11 wherein said laminate substrate reference pad is a
5 laminate substrate ground pad.

13. The structure of claim 11 wherein said each of said plurality of laminate substrate reference vias is a laminate substrate ground via.

14. The structure of claim 11 wherein said each of said plurality of laminate substrate reference vias is electrically connected to said laminate substrate reference pad.

15. The structure of claim 11 wherein said each of said plurality of laminate substrate reference vias is electrically connected to a respective one of a plurality of
15 printed circuit board reference vias in a printed circuit board.

16. The structure of claim 15 wherein each of said plurality of printed circuit board reference vias is electrically connected to a printed circuit board reference pad.

20 17. The structure of claim 11 wherein said laminate substrate comprises an organic material.

18. The structure of claim 11 wherein said laminate substrate comprises a ceramic material.

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5 19. The structure of claim 11 wherein a shape of said antenna element is selected from the group consisting of a square shape, a rectangular shape, a slot line pattern, a meander line pattern, and a patch pattern.

20. The structure of claim 11 wherein said each of said laminate substrate reference vias is electrically connected to a respective one of a plurality of laminate substrate ball pads on said bottom surface of said laminate substrate.